

What is claimed is:

1. An equivalent circuit for a voltage-controlled variable capacitive element, comprising:
 - a MOS transistor having a source and a drain connected to each other;
 - a first voltage source connected between a source/drain terminal of said MOS transistor and a substrate terminal; and
 - a fixed capacitor connected between a gate electrode of said MOS transistor and said substrate terminal,
said equivalent circuit being used to simulate characteristics of said voltage-controlled variable capacitive element by a characteristics of capacitance between a gate terminal connected to said gate electrode of said MOS transistor and said substrate terminal.
2. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 1, further comprising a second voltage source connected between said gate terminal and said gate electrode.
3. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 1, wherein said MOS transistor is a P-channel MOS transistor.
4. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 2, wherein said MOS transistor is a P-channel MOS transistor.
5. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 1, wherein said characteristics, to be simulated, of said voltage-

controlled variable capacitive element are C-V characteristics of how gate to substrate capacitance C varies with gate to substrate voltage v.

6. The equivalent circuit for a voltage-controlled
5 variable capacitive element according to claim 2, wherein said characteristics, to be simulated, of said voltage-controlled variable capacitive element are C-V characteristics of how gate to substrate capacitance C varies with gate to substrate voltage v.

10 7. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 3, wherein said characteristics, to be simulated, of said voltage-controlled variable capacitive element are C-V characteristics of how gate to substrate capacitance C varies with gate to substrate voltage v.

15 8. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 5, wherein a capacitance value of said fixed capacitor is adjusted so that values of said gate to substrate capacitance corresponding to said C-V characteristics are entirely increased.

20 9. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 6, wherein a capacitance value of said fixed capacitor is adjusted so that values of said gate to substrate capacitance corresponding to said C-V characteristics are entirely increased.

25 10. The equivalent circuit for a voltage-controlled

variable capacitive element according to claim 7, wherein a capacitance value of said fixed capacitor is adjusted so that values of said gate to substrate capacitance corresponding to said C-V characteristics are entirely increased.

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11. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 5, wherein a voltage value of said first voltage source is adjusted so that a gate to substrate voltage at which an inversion layer 10 is created is shifted in a direction of negative voltage.

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12. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 6, wherein a voltage value of said first voltage source is adjusted so that a gate to substrate voltage at which an inversion layer 15 is created is shifted in a direction of negative voltage.

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13. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 7, wherein a voltage value of said first voltage source is adjusted so that a gate to substrate voltage at which an inversion layer 20 is created is shifted in a direction of negative voltage.

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14. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 5, wherein a voltage value of said second voltage source is adjusted so that values of said gate to substrate voltage corresponding 25 to said C-V characteristics are entirely increased toward the side of positive potential.

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15. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 6, wherein a

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voltage value of said second voltage source is adjusted so that values of said gate to substrate voltage corresponding to said C-V characteristics are entirely increased toward the side of positive potential.

- 5 16. The equivalent circuit for a voltage-controlled variable capacitive element according to claim 7, wherein a voltage value of said second voltage source is adjusted so that values of said gate to substrate voltage corresponding to said C-V characteristics are entirely increased toward
10 the side of positive potential.